sealing the vacuum between the baseplate and the faceplate after the pre-aging.

REMARKS

This is a full and timely response to the Official Action dated August 28, 2002 (Paper No. 03). Reexamination and reconsideration in light of the above amendments and the following remarks are courteously requested.

Specification

The specification has been reviewed and changes made to prepare this application for final printing. Since those changes are minor in nature, it is submitted that they do not constitute new matter.

Claims

Claims 1 to 20 were pending in this application as filed. Each of the claims has been amended to indicate that the invention relates to a method of manufacturing a flat panel display, by using conventional method step language. It is believed that this change will better emphasize that the claimed method relates to a method of making a flat panel display, rather than a method of using a emission device.

Anticipation Rejection of Claim 1

Claim 1, as filed, was initially rejected as allegedly being unpatentable over Niigaki, No. 5,959,400. This rejection is respectfully traversed. Niigaki fails to show each and every limitation of original claim 1, or claim 1 as amended, directed to a

method for manufacturing a flat panel display according to defined steps. The rejection as stated appears to relate primarily to a method of using an emission device of the type taught by Niigaki.

The Examiner cited Fig. 2 and Column 4, lines 20 to 64; column 5, lines 25 to 31, and column 7, lines 20 to 25 of Niigaki in support of the anticipation rejection. Fig. 2 and the former passage discuss the completed structure of an electron tube according to a first embodiment that has a diode configuration. Of importance in understanding the absorption or desorption functioning mentioned at column 4, lines 48 et seq., reference should be made to column 4, lines 1 to 9. There, it is described that the surface of the diamond constituting the emitter is terminated with hydrogen to exhibit a negative electron affinity under conditions that preserve the surface state of the emitter. The absorption and desorption that respectively occurs is a result of heat (see col. 4, lines 46 to 48). In essence, the passage has little to do with making a flat panel display.

The passage in Niigaki at col. 5, lines 25 to 31 likewise relates to making the field emitter itself and add little to understanding the position of the Examiner as to the recited steps. Finally, col. 7, lines 20 to 25 also add little to describing how the field display is made for comparison with the Applicant's claimed invention.

It would have been helpful if the examiner had more specifically stated where in Niigaki the disclosure corresponding to the claimed steps was found. In the absence of a side-by-side comparison, the Applicant was left to try to understand how the cited passages

applied to the claim, thus concluding that they did not teach the recited steps.

Claim 1 specifically recites the steps of providing a baseplate (102) and a faceplate (150, 160), followed by a step of desorption processing the faceplate in a vacuum, followed by merging the base plate and the faceplate, and then sealing the vacuum between the baseplate and the faceplate. At the heart of the invention is the recognition that outgassing that normally occurs during the first few hours of operation can be reduced by desorption processing of the flat panel display. Three embodiments are disclosed on page 3, lines 8 to 18, i.e. plasma scrubbing, electron irradiation pre-aging, and electron irradiation pre-aging of the faceplate in an evacuation process. Niigaki says little about reducing outgassing, and says nothing about a recognition that outgassing can be reduced by desorption processing of the faceplate in a vacuum. To what little extent, Niigaki speaks in terms similar, it should be noted that the concepts are not in connection with the making of a flat panel display.

Reference may again be made to pages 1 to 3 for its discussion of background art that perhaps is more relevant to the claimed invention that the cited references, at least for its indication of prior methods of making such devices, and shortcomings that need to be addressed, and that were addressed by the claimed invention.

Moreover, the finding of the Examiner as to claims 3 to 20 on what Niigaki fails to show are revealing, and applicable here. The deficiencies of Niigaki are there explored as to the disclosed invention and as to the invention as claimed in claims 3 to 20. It

is submitted that those shortcomings are applicable to claims 1 and 2 as well.

Reconsideration of the rejection is requested.

Rejection of claim 2

Claim 2, dependent on claim 1, was rejected as being obvious over the same reference to Niigaki that allegedly discloses the same invention except for the use of a vacuum from 10^{-7} to 10^{-8} Torr. This rejection is likewise respectfully traversed. This rejection is deficient at the very least for the same reasons that the rejection of claim 1 is deficient -- Niigaki does not disclose a step of desorption processing of the faceplate in a vacuum during manufacturing the claimed flat panel display.

As to the findings of the Examiner that the use of a vacuum as claimed involves only routine skill in the art as discovering a result effective variable, this finding is traversed. For the claimed process, in the absence of art teaching, suggesting, or enabling the making of a faceplate by preassembly desorption processing in a vacuum, no finding of result effective variations are appropriate. This counterargument is applicable to any of claims 3 to 20 that depend on a statement of vacuum pressure for completeness.

Reconsideration of this rejection is respectfully requested.

Rejection of claims 3 to 20

Claims 3 to 20 were initially rejected as being unpatentable over Niigaki in view of Browning, No. 6,409,564. This rejection is respectfully traversed.

At the outset, it can be noted that the deficiencies of Niigaki as to any of claims 3 to 20 are agreed with, as far as they go, and to which should be added the counterarguments noted in claim 1 above. Succinctly stated, Niigaki does not relate to the method of making the claimed flat panel display.

But even accepting the deficiencies of Niigaki as to claims 3 to 20 as posited by the Examiner, the rejection as stated fails to make a prima facie case of obviousness in that insufficient factual reasons are found in the references themselves to support the requisite finding that a motivation, incentive, or reason exists in the art for making the combination. Specifically, the findings are in the form of conclusions and results, rather than reasons for modifying Niigaki with the teachings of Browning. See the first full paragraph on page 4 and the paragraph spanning pages 4 and 5 of the Action.

A reason for not making the combination is found in Browning and Niigaki when each is considered as a whole. Browning discusses techniques in col. 1, line 11 to col. 2, line 21 for initially aging phosphor screens prior to the sale of the display, achieved after the display has been assembled. Browning criticizes that technique -- i.e. the technique of Niigaki when considered as a whole. This would thus discourage the application of Browning's techniques to Niigaki.

Browning contributes, to be sure, to the art by suggesting screen scrubbing prior to assembly of the device, see col. 2, lines 24 to 39, but the suggestion is limited to oxygen (and/or sulfur) contamination prior to assembly.

Another reason that would inhibit one of skill in this art from modifying Niigaki according to Browning is found in col. 6, lines 24 to 33. There, it is said that scrubbing is accomplished without employing the field emission cathode, i.e. the baseplate as claimed. This passage teaches away from the combination proposed by the Applicant.

Reconsideration is thus requested for the propriety of the combination in the first instance.

Rejection of Claims 6 to 8, 10, 13 and 15

It is noted with appreciation that the Examiner found that Browning/Niigaki combination essentially does not disclosure the combination of claims 6 to 8, 10, 13 and 15 (see the last full paragraph on page 4 of the Action). At the very least, therefore, based on this finding and observation, these claims should be allowed. If the parameters are as obvious as alleged at the tope of page 5 of the Action, a teaching is requested. Under the present record, the only teaching of those parameters is found in the Applicant's specification and its use is not available against the Applicant. Hindsight reconstruction is not the rule.

Since the combination posed, even if proper, fails to teach each and every limitation of the claims noted, the rejects are improper and should be withdrawn.

Reconsideration of the rejections is respectfully requested.

Respectfully submitted,

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APPENDIX 1

SPECIFICATION AMENDMENTS

Please replace the paragraph beginning on page 2, line 13, with the following new paragraph:

Electron emissions in FEDs require a low internal pressure and that they be contaminant-free to avoid serious problems, such as pressure degradation, emission current degradation, and/or plasma generation or ionization which can lead to non-uniform brightness of the display, decrease display efficiency, and/or shortening of the working life of the display.

Please replace the paragraph beginning on page 2, line 26, with the following new paragraph:

Another approach is forming a getter at a location along the interior surface of a baseplate or/and faceplate. This is disadvantageous because a getter typically needs a substantial amount of surface area to perform the gas collection function and this approach significantly reduces the active-to-overall area ratio. In addition, the active components of the FED easily become contaminated during the gettering material deposition process and some of the active FED components could become short-circuited.

Please replace the paragraph beginning on page 6, line 4, with the following new paragraph:

Referring now to FIG. 4, therein is shown a schematic cross section of a faceplate 160 of a flat panel display being subject to desorption processing to accelerate outgassing in a vacuum chamber 162 in accordance with a second embodiment of the present invention. The vacuum chamber 162 is capable of being evacuated by a vacuum pump 164.

APPENDIX

CLAIM AMENDMENTS

1. (Amended) A method for manufacturing a flat panel display comprising the steps of:

providing a baseplate and a faceplate;

desorption processing the faceplate in a vacuum;

merging the baseplate and the faceplate; and

sealing the vacuum between the baseplate and the faceplate.

2. (Amended) The method as claimed in claim 1 wherein the step of desorption processing uses a vacuum from 10^{-7} to 10^{-8} torr.

3. (Amended) The method as claimed in claim 2 wherein the step of desorption processing includes the step of scrubbing the faceplate before the step of sealing the vacuum between the baseplate and the faceplate.

4. (Amended) The method as claimed in claim 3 wherein the step of scrubbing the faceplate uses plasma sputtering.

5. (Amended) The method as claimed in claim 4 wherein the step of plasma sputtering uses a low atomic weight gas.

6. (Amended) The method as claimed in claim 4 wherein the step of plasma sputtering uses ions and a faceplate voltage of -10 to -1000 mV.

7. (Amended) The method as claimed in claim 4 wherein the step of plasma sputtering uses electrons and a faceplate voltage of +10 to +1000 mV.

8. (Amended) The method as claimed in claim 4 wherein the step of plasma sputtering applies a faceplate voltage for about 1 to 60 minutes.

9. (Amended) The method as claimed in claim 1 wherein the step of desorption processing includes a step of pre-aging the faceplate.

10. (Amended) The method as claimed in claim 9 wherein the step of pre-aging the faceplate is performed from 120 to 300 minutes.

11. (Amended) The method as claimed in claim 10 wherein the step of desorption processing includes a step of pre-aging before merge of the baseplate and the faceplate.

12. (Amended) The method as claimed in claim 11 wherein the step of pre-aging uses irradiation with electrons from an electron gun.

13. (Amended) The method as claimed in claim 12 wherein the step of pre-aging uses irradiation with electrons having a current density of 5 to 10 times higher than that of the faceplate during normal operation.

14. (Amended) The method as claimed in claim 10 wherein the step of desorption processing includes a step of pre-aging after merge of the baseplate and the faceplate.

15. (Amended) The method as claimed in claim 14 wherein the step of pre-aging includes application of a voltage of 6 to 9 kV between the baseplate and the faceplate.

16. (Amended) A method for manufacturing a flat panel display comprising the steps of:

providing a baseplate and a faceplate;

desorption processing the faceplate by scrubbing with plasma sputtering in a vacuum;

merging the baseplate and the faceplate in the vacuum after the plasma sputtering; and

sealing the vacuum between the baseplate and the faceplate.

17. (Amended) A method for manufacturing a flat panel display comprising the steps of:

providing a baseplate and a faceplate;

desorption processing the faceplate by scrubbing with ion plasma sputtering in a vacuum;

merging the baseplate and the faceplate in the vacuum after the ion plasma sputtering; and

sealing the vacuum between the baseplate and the faceplate.

18. (Amended) A method for manufacturing a flat panel display comprising the steps of:

providing a baseplate and a faceplate;

desorption processing the faceplate by scrubbing with electron plasma sputtering in a vacuum;

merging the baseplate and the faceplate in the vacuum after the electron plasma sputtering; and

sealing the vacuum between the baseplate and the faceplate.

19. (Amended) A method for manufacturing a flat panel display comprising the steps of:

providing a baseplate and a faceplate;

desorption processing the faceplate by pre-aging using electron irradiation in a vacuum;

merging the baseplate and the faceplate in the vacuum after the electron irradiation; and

sealing the vacuum between the baseplate and the faceplate.

20. (Amended) A method for manufacturing a flat panel display comprising the steps of:

providing a baseplate and a faceplate;

merging the baseplate and the faceplate;

evacuating between the baseplate and the faceplate;

desorption processing the faceplate by pre-aging using electron irradiation during the evacuating between the baseplate and the faceplate to form a vacuum therebetween; and

sealing the vacuum between the baseplate and the faceplate after the pre-aging.